

Understanding LEED for Homes v4

A Nine Part Series



Module #7: Environmental Quality (EQ)



Continuing Education

1 CE for this course

9 CEs for entire session

✓ AIA (HSW)

✓ LEED Specific

Local & State Contractor or Architect License may apply



EDUCATION
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Formerly



- Founded 2000
- Midwest LEED for Homes Provider
- 501(c)3 non-profit; mission:



Empowering people to make more informed and sustainable choices building and remodeling of the places we live.

Moderator

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Multi-Speed

Condensation Sensor

Motion Sensor

LED Night Light



Panasonic



Key Features

- ❑ Customizable, all-in-one fan and fan/LED light combinations
- ❑ Pick-A-Flow speed selector - one fan, you choose the CFM
- ❑ Unique Plug 'N Play modules provide up to three value added features
- ❑ Revolutionary DC motor with SmartFlow™ technology
- ❑ Two replaceable, self-ballasted GU24 base LED lamps
- ❑ Flex-Z Fast™ installation bracket
- ❑ Can be used to comply with ASHRAE 62.2, LEED, Cal-Green and ENERGY STAR for Homes 3.0



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Detailed Features and Benefits (cont'd)

A unique set of Four Plug 'N Play™ modules enable further customization *



Multi-Speed with Time Delay

Allows you to select the proper CFM settings to satisfy ASHRAE 62.2 continuous ventilation requirements. The fan runs continuously at a pre-set lower level, then elevates to a maximum level of operation when the switch is turned on, or the SmartAction® motion sensor module is activated. A High/Low delay timer returns the fan to the pre-set CFM level after a period of time set by the user.



Condensation Sensor

Helps control bathroom condensation to prevent mold and mildew. Advanced sensor technology detects relative humidity and temperature, automatically turning the fan on to control humidity.



SmartAction® Motion Sensor

Automatically activates when someone enters a room. Once the module is inserted, the fan becomes truly automatic, making it the lowest installed cost solution for meeting ASHRAE 62.2 whole house continuous and spot ventilation. Also ideal for people with disabilities and assisted living environments such as nursing homes and retirement communities.



NiteGlo™ LED Night Light

A specialized photocell feature automatically turns on the LED night light when darkness is sensed in the room. Hi/Low brightness switch enables you to select the intensity of light output.



**Select up to 3 value added features to create your ideal fan.*

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Multi Family Solutions



WhisperValue Fan

- 3 ¾" depth – UL approved for wall application
- No fire damper necessary



Condensation Switch

- Turns on automatically as the room reaches dewpoint
- 30 minute time delay



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LEED Faculty (former)
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Agenda Module 7



- Review of MR
- Environmental Quality (EQ)
- Project Examples
- Review / Next Module

Learning Objectives

Materials and Resources (MR)



Student participants will be able to:

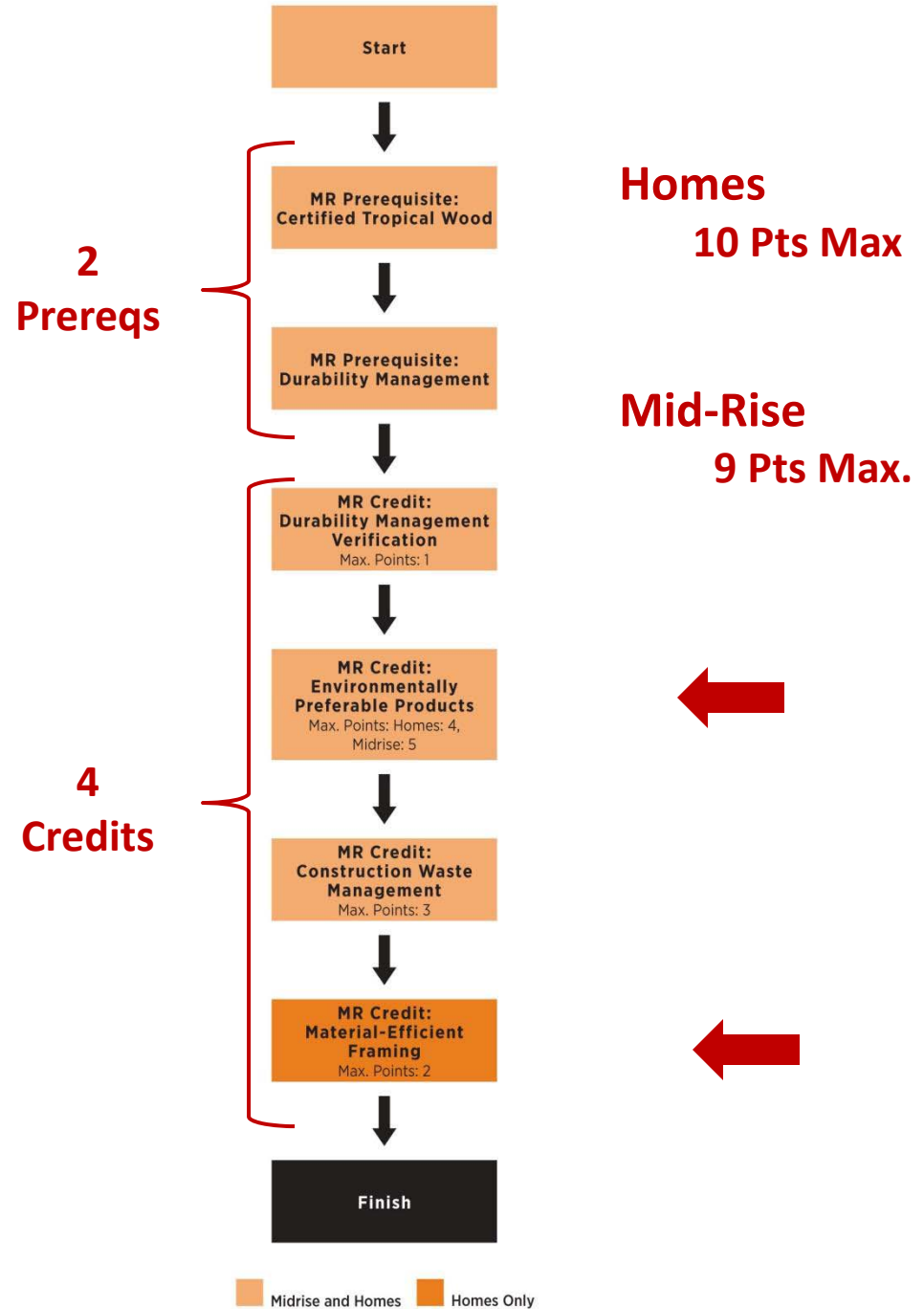
- Describe changes in v4 Rating System from v2008.
- Identify prereqs and credits in the EQ category.
- Apply MR prereqs and credits to a project.
- Fill-out the v4 workbook.

Review Module 6

Materials and Resources (MR)



Materials and Resources (MR)



Review: Module 6

Materials and Resources (MR)

Removed

- Prereq MR 1.1 Framing Order Water
- Prereq MR 3.1 Construction Waste Plan
- Credit MR 1.3 Cut List & Lumber Order
- Credit MR 1.5 Off-Site Manufacturing

Changed (moved in)

- Prereq ID 2.2 Durability Management
- Credit ID 2.3 3rd Party Verification (1 pt.)

Changed (moved out)

- Credit MR 2.2 Low Emission Products

Total Points

From 16 pts. to 10 pts. (9 for Mid-Rise)



Overall Impact: Beneficial for

Review: Module 6

Materials and Resources (MR)

MR Prereq: Certified Wood.

Question: What is the “Forest Sustainability Council”?

Answer: Typo Alert (in Rating System)

MR Credit EPPs

Local: 50% of building component required to meet criteria

Question: Is this 50% of components within a product must be local (e.g., 50% of each window’s components are local), OR 50% of assembly must use local products (e.g., 50% of windows used are locally, and 50% are not).

Answer: Either approach, so long as 50% of the total component (by weight or volume) is local.

Note: Local production can only be earned for 3 components:

1. Framing,
2. Aggregate for concrete and foundation,
3. Drywall/interior sheathing).

Review: Module 6

Materials and Resources (MR)

MR Credit EPPs

Extended producer responsibility. Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility.

Question: **What is “Extended Producer Responsibility Program?”**

Answer:

- Basically, it’s a program where the manufacturer will take back the product at the end of the product’s life.
- Carpeting, for example is heading down this path.
- USGBC is developing a list of manufacturers/products as they become available.

Review: Module 6

Materials and Resources (MR)

Credit Example

MR C3: Construction Waste

Multifamily Building

Common area, 1,000 Sq Ft

1 Bedroom, 10 Units @ 800 Sq Ft

2 Bedroom, 10 Units @ 1,000 Sq Ft

Reference Waste

= 4.2 Lbs / Sq Ft x Baseline Building Floor Area

Baseline Building Floor Area

= non-unit area +

reference home size for each of the units

= 1,000 + (1,000*10) + (1,600 *10)

= 27,000 Sq Ft



Review: Module 6

Materials and Resources (MR)

Credit Example (cont'd)

MR C3: Construction Waste

Reference Waste

$$= 4.2 \text{ Lbs /SF} \times 27,000 \text{ Sq Ft}$$

$$= 113,400 \text{ Lbs}$$

Actual Total Waste

$$= 80,000 \text{ lbs}$$

Diversion Rate

$$= 90\% (72,000 \text{ Lbs})$$

Net Waste

$$= 80,000 - 0.25 \times 72,000$$

$$= 62,000 \text{ Lbs}$$

Reduction = Reference Waste – Net Waste

$$= 113,400 - 62,000 = 51,400 \text{ lbs} = 45\% = \mathbf{2.0 / 3.0 \text{ Points}}$$



Materials and Resources

Filter Credits

MR Credit Construction Waste Management

Up to 3 points

Total

Attempted Y

2

M

0

Verified

0

Exemplary Performance: For renovation projects, track and divert at least 50% of demolition waste.

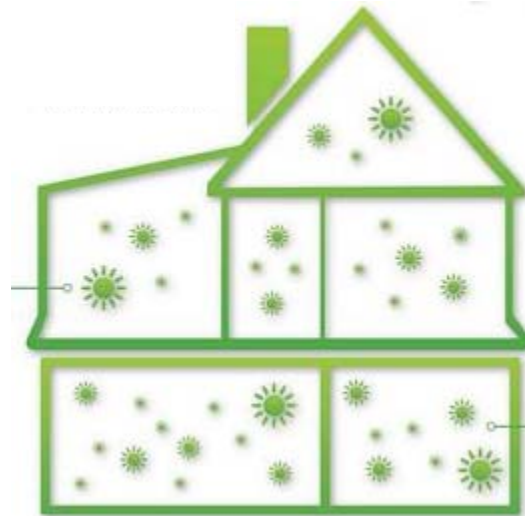
113,400.00	Baseline waste allowance (lbs)	
8,000.00	Waste to landfill (lbs)	
72,000.00	Recycled waste (lbs)	
80,000.00	Total waste (lbs)	62,000
70.55%	Percent reduction below baseline (%)	45%

Verification Measure

- Verify that calculations of construction waste are based on waste hauling documents.

Module 7

Environmental Quality (EQ)

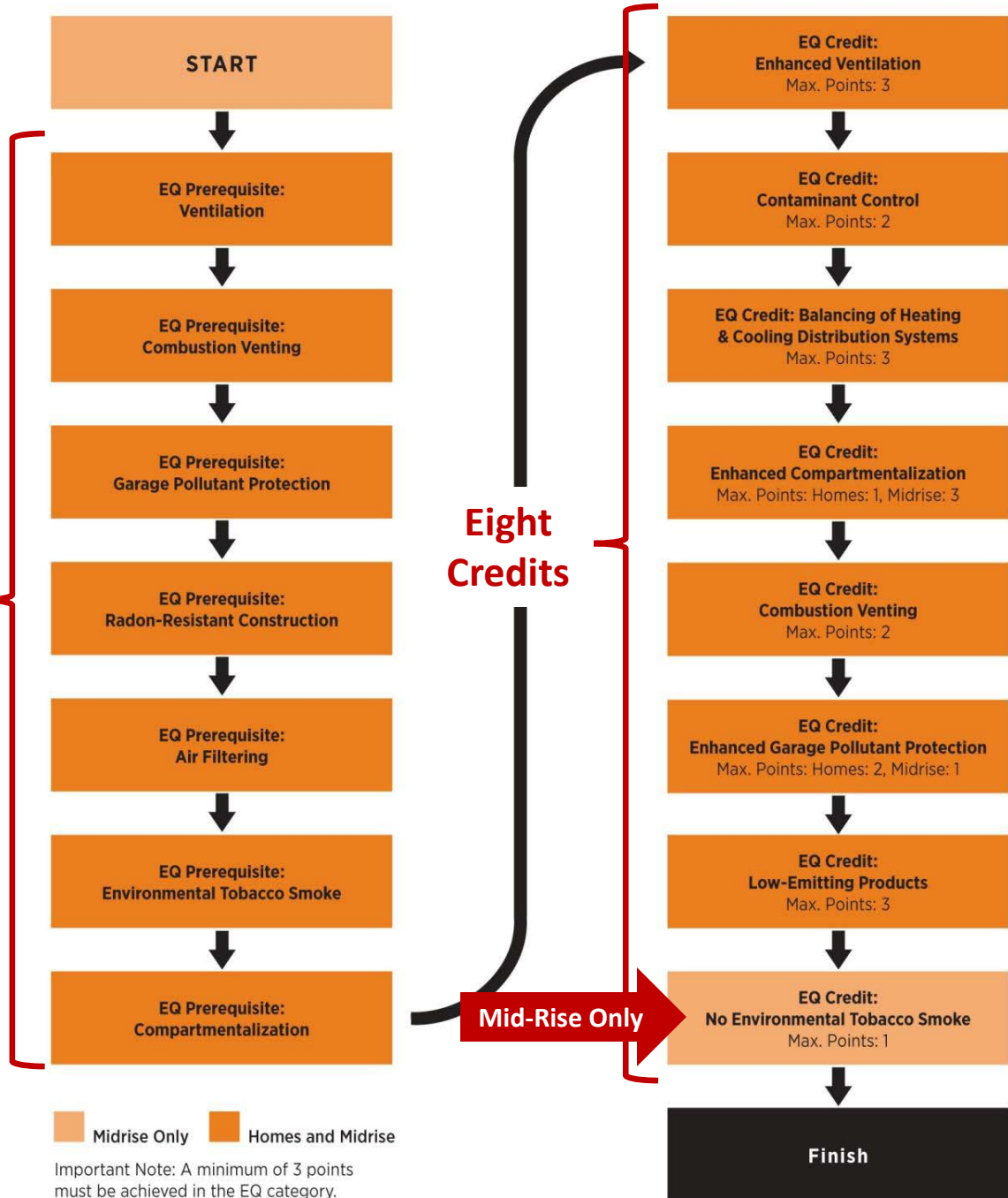


**Indoor
Pollutants
>>
Outdoor
Pollutants
??**

Indoor Environmental Quality (EQ)



Seven Prereqs



Midrise Only
 Homes and Midrise

Important Note: A minimum of 3 points must be achieved in the EQ category.

Overview of EQ

New Prereqs

EQ P1 Ventilation (Std 62.2-2010)

EQ P6 No ETS in Common Areas*

EQ P7 Compartmentalization*

* For ALL Attached SF, & Lowrise and Midrise MF

Point Floor

Changed from 6 pts. to 3 pts.

Moved In

MR 2.2 Low Emitting Products

Total Points

From 22 to 16



Don't be Afraid of Change

Indoor Environmental Quality (EQ)

EQ P1 Ventilation

EQ P2 Combustion Venting

EQ P3 Garage Pollutant Protection

EQ P4 Radon-Resistant Construction

EQ P5 Air Filtering

EQ P6 Environmental Tobacco Smoke

EQ P7 Compartmentalization

EQ P1 Ventilation

Prerequisite Applies to

- Homes & [Midrise](#)

Intent

- To reduce moisture problems and occupants' exposure to indoor pollutants from kitchens, bathrooms and other sources by exhausting pollutants to outside and ventilating with outdoor air.

Requirements

Case 1. Single Family

1. Local Exhaust. Meet all the following requirements:
2. Whole House Mechanical Ventilation.

Case 2. Multifamily

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of this prerequisite.

EQ P1 Ventilation (cont'd)



Requirements

Case 1. Single Family

- Meet all of the following requirements for local exhaust and outdoor air ventilation including the requirements of **ASHRAE 62.2 – 2010**, sections 4, 5 and 7 and Section 1504.4 of the 2009 International Residential Code (IRC), including:

1. Local Exhaust.

Meet all the following requirements:

- Design and install local exhaust systems in all bathrooms (including half-baths) and the kitchen to meet the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent. Sample requirements that relate to minimum intermittent local exhaust flow rates are shown in **Table 1**.
- Exhaust air to the outdoors. Do not route exhaust ducts to terminate in attics or interstitial spaces. Recirculating range hoods or recirculating over-the-range microwaves do not satisfy the kitchen exhaust requirements.
- Use ENERGY STAR–labeled bathroom exhaust fans in all bathrooms (including half-baths) or performance equivalent for projects outside the U.S. A HRV or ERV can be used to exhaust single or multiple bathrooms if it has an efficacy level of greater than or equal to 2.8 cfm/Watt (1.3 liters per second/Watt) as certified by HVI.
- For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), **provide makeup air** at a rate approximately equal to the exhaust air rate. Makeup air systems must have a means of closure and be automatically controlled to start and operate simultaneously with the exhaust system.

EQ P1 Ventilation (cont'd)

Table 1. Minimum air-flow requirements for intermittent local exhaust

	<i>Minimum air flow</i>
Kitchen	100 cfm (47 liters per second); vented range hood required if continuous exhaust fan flow rate is less than 5 kitchen air changes per hour
Bathroom, half-bath	50 cfm (23 liters per second)

EQ P1 Ventilation (cont'd)

AND 2. Whole House Mechanical Ventilation.

Design and install a whole-house mechanical ventilation system that complies with ASHRAE Standard 62.2–2010, Sections 4 and 7 or local equivalent, whichever is more stringent.

Whole house ventilation fans must be rated for sound at a maximum of 1.0 sone per ASHRAE 62.2–2010, Section 7.2.1. Remote mounted fans need not meet these sound requirements.

The ASHRAE options can be summarized as follows:

- **Continuous ventilation.** Meet the ventilation requirements. Simplified minimum *air-flow requirements are shown in Table 2.*
- **Intermittent ventilation.** Use ASHRAE Standard 62.2–2010, Equation 4.2, to demonstrate adequate ventilation air flow.
- Any **passive ventilation** system must be approved and verified by a licensed HVAC engineer as providing ventilation equivalent to that achieved by continuous ventilation systems.

EQ P1 Ventilation (cont'd)

Table 2a. Simplified minimum air-flow requirements (cfm) for continuous ventilation systems

Conditioned floor area (ft ²)	Bedrooms				
	0, 1	2, 3	4, 5	6, 7	> 7
≤ 1,500	30	45	60	75	90
1,501–3,000	45	60	75	90	105
3,001–4,500	60	75	90	105	120
4,501–6,000	75	90	105	120	135
6,001–7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

Table 2b. Simplified minimum air-flow requirements (liters per second) for continuous ventilation systems

Conditioned floor area (m ²)	Bedrooms				
	0, 1	2, 3	4, 5	6, 7	> 7
≤ 139	14	21	28	35	42
140 – 279	21	28	35	42	49
280 – 418	28	35	42	49	56
419 – 557	35	42	49	56	63
558 – 697	42	49	56	63	70
> 698	49	56	63	70	77

EQ P1 Ventilation (cont'd)

Requirements

Case 2. Multifamily

Design and install a whole-unit ventilation system for each individual dwelling unit that complies with the requirements of ASHRAE Standard 62.2–2010 (with errata) or local equivalent, whichever is more stringent, and all local exhaust requirements for Single Family section, above.

For all **non-unit spaces**, meet the minimum requirements of ASHRAE Standard 62.1–2010 or local equivalent, whichever is more stringent, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata).

Mechanically ventilated spaces must be designed using the ventilation rate procedure or the applicable local code, whichever is more stringent. Ventilation fans that penetrate rated assemblies may require radiation and fire dampers to meet local building and fire codes.

Naturally ventilated spaces must comply with ASHRAE Standard 62.1–2010, Paragraph 5.1 (with errata). [Mech vent'n required, except where **guarantee** that windows will be used.]

EQ P1 Ventilation (cont'd)

Major components of Standard 62.2-2010 are summarized below.

- Provide outdoor air to each unit directly from the outdoors. Project teams using **exhaust ventilation** systems must specify how outside air is delivered at the flow rate required by ASHRAE 62.2–2010. Do not use systems that rely on transfer air from pressurized hallways or corridors, adjacent dwelling units, attics, etc.
- For **continuous ventilation** systems, meet the requirements of ASHRAE 62.2–2010 shown in Table 2, Continuous in-unit ventilation fans must be rated for sound at a maximum of 1.0 sone, per ASHRAE 62.2–2010, Section 7.2.1. Remote mounted fans need not meet these sound requirements.
- For **intermittent ventilation** systems, install fans to meet ASHRAE Standard 62.2–2010. The fan flow rate must be equal to the outdoor air flow requirements multiplied by the fan flow rate multiplier. The system must be designed such that it can operate automatically based on a timer. Fans must be rated for sound at a maximum of 1.0 sone. Remote mounted fans need not meet these sound requirements.

EQ P1 Ventilation (cont'd)

Major components of Standard 62.2-2010 (cont'd)

- As applicable, follow the restrictions on system types for **hot, humid climates** and **very cold climates**.
 - In hot, humid climates, whole-house mechanical net exhaust flow must not exceed 7.5 cfm per 100 square feet (38 liters per second per 100 square meters) of conditioned floor area.
 - In very cold climates, mechanical supply-only systems must not exceed 7.5 cfm per 100 square feet (38 liters per second per 100 square meters). See ASHRAE 62.2–2010, Sections 4.5 and 8, for more details and climate categories.
- Locate **air inlets** that are part of the ventilation design at least 10 feet (3 meters) from known sources of contamination, such as a stack, vent, exhaust hood, or vehicle exhaust. Place the intake such that entering air is not obstructed by snow, plantings, or other material. Forced air inlets must be covered by screens to exclude rodents and insects (mesh not larger than ½ inch or 13 millimeters). See ASHRAE 62.2–2010, Section 6.8, for more details and a list of exceptions.

Indoor Environmental Quality

Filter Credits

EQ Prerequisite Ventilation

Required

Required

Verified

N

Case 1. Single Family

V

(Select one)

The project has earned the EPA Indoor airPLUS label

OR

Local Exhaust

Confirm all of the following have been implemented on the project:

True

Local exhaust systems meeting the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.

True

Local exhaust systems exhaust air directly to the outdoors.

True

All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.

True

For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate.

Whole House Mechanical Ventilation

True

The project meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.

Verification Measure

- Verify that bathroom & kitchen fans meet prerequisite requirements for sound and performance AND Test exhaust fans to ensure they are exhausting sufficient airflow to meet prerequisite requirements, and verify that exhaust goes directly to outdoors.
- Verify that whole house mechanical ventilation calculation is correct.

Think About It....



EQ P1 requires the use of ____?

- a) ASHRAE Standard 62.2 - 2007
- b) ASHRAE Standard 62.2 – 2010
- c) ASHRAE Standard 62.2 – 2013
- d) None of the above.

EQ P2 Combustion Venting

Prerequisite Applies to

- Homes & [Midrise](#)

Intent

- To limit the leakage of combustion gases into the occupied space of the home.

Requirements

- Do not install any unvented combustion appliances (ovens and ranges excluded).
- Install a carbon monoxide (CO) monitor on each floor, hard-wired with a battery backup. In multifamily buildings, install a CO monitor on each floor of each unit.
- For all fireplaces and woodstoves inside the building, provide doors that close or a solid glass enclosure. Interior fireplaces and woodstoves that are not closed-combustion or power-vented must pass BPI or RESNET combustion safety testing protocols to ensure that depressurization of the combustion appliance zone is less than 5 Pa.
- Space- and water-heating equipment that involves combustion must meet one of the following:
 - it must be designed and installed with closed combustion (i.e., sealed supply air and exhaust ducting);
 - it must be designed and installed with power-vented exhaust; or
 - it must be located in a detached utility building or open-air facility.

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of this prerequisite.

Think About It....



**v4 EQ P1 Combustion Venting
is the same as v2008.**

a) True

b) False

EQ P3 Garage Pollutant Protection

Prerequisite Applies to

- Homes & [Midrise](#)

Intent

- To reduce occupants' exposure to indoor pollutants originating from an adjacent garage.

Requirements

- Place all air-handling equipment and ductwork outside the fire-rated envelope of the garage.
- Tightly seal shared surfaces between the garage and conditioned spaces, including all of the following:
- In conditioned spaces above the garage, seal all penetrations and all connecting floor and ceiling joist bays.
- In conditioned spaces next to the garage, weather-strip all doors, install carbon monoxide detectors in rooms that share a door with the garage, seal all penetrations, and seal all cracks at the base of the walls.

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of this prerequisite.

EQ P4 Radon-Resistant Construction

Prerequisite Applies to

- Homes & [Midrise](#)

Intent

- To reduce occupants' exposure to radon gas and other soil gas contaminants.

Requirements

- Case 1. New Construction
- Case 2. Renovation of Existing Building

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of this prerequisite.

EQ P4 Radon-Resistant Construction (cont'd)

Requirements

Case 1. New Construction

- If the building is in EPA radon zone 1 (or local equivalent for projects outside the United States), design and build with radon-resistant construction techniques, as prescribed by American Association of Radon Scientist and Technologists (AARST), Reducing Radon in New Construction of 1 & 2 Family (RRNC 2.0); EPA Building Radon Out; NFPA 5000, Chapter 49; International Residential Code, Appendix F; CABO, Appendix F; ASTM E1465; or a local equivalent, whichever is more stringent.
- Follow all the requirements listed in Indoor airPLUS, 2.1:
 - Provide a capillary break per the Indoor airPLUS specifications.
 - Provide an electrical outlet near vent piping in the attic to facilitate future fan installation.
 - Install a 3- or 4-inch (or approximately 80- or 100- millimeters) diameter gas-tight vertical vent pipe with no bends greater than 45 degrees, connected to an open T-fitting in the aggregate layer, extending up through the conditioned spaces and terminating at least 12 inches (300 millimeters) above the roof opening.
- The requirements for radon protection are automatically satisfied if the building is elevated by at least 2 feet (600 millimeters), with open air space between the building and ground. An enclosed vented crawlspace does not qualify. A garage under a building is an acceptable alternative.
- For mixed-use buildings, **non-residential space is exempted.**

EQ P4 Radon-Resistant Construction (cont'd)

Requirements (cont'd)

Case 2. Renovation of Existing Building

- If the building is in EPA radon zone 1 (or local equivalent for projects outside the United States), and if no slab work is being performed (i.e., an existing slab is not being demolished, and no new slab floor is being built), test the building for radon. If the results are greater than 4 pCi/L, install an active ventilation system. If the results are less than 4 pCi/L, no radon-resistant construction techniques are required.

Indoor Environmental Quality

Filter Credits

EQ Prerequisite Radon-Resistant Construction

Required

Required

Verified

N

Exemplary Performance: For projects in radon zones 2 and 3, install a qualifying passive radon ventilation system.

EPA Indoor airPLUS label

V

(Select one)

The project has earned the EPA Indoor airPLUS label

OR

Case 1. New Construction

V

1.00

EPA radon zone

For projects in EPA radon zone 1

True

There is a capillary break per the Indoor airPLUS specifications.

True

An electrical outlet has been provided near vent piping in the attic to facilitate future fan installation.

True

A gas-tight vertical vent pipe extending up through the conditioned spaces and terminating above the roof opening has been installed.

OR

N/A

The house is elevated by at least 2 feet (600 millimeters) with open air space between building and ground or there is a garage under the building.

Verification Measure

- Conduct on-site verification that radon-resistant construction elements are installed, including gas-permeable layer (e.g., gravel) and capillary break (e.g., plastic sheeting).
- Conduct on-site verification that radon-resistant construction elements are installed, including electrical outlet near vent piping.
- Conduct on-site verification that radon-resistant construction elements are installed, including 3- or 4-inch (approximately 80- or 100-millimeter) vent piping that meets requirements.

EQ P5 Air Filtering

Prerequisite applies to

- Homes & [Midrise](#)

Intent

- To protect occupants' health by reducing particulate matter from the air supply system.

Requirements

- Install air filters with a minimum efficiency reporting value (**MERV**) of **8** or higher on all recirculating space conditioning systems, per ASHRAE 62.2–2010. Design ductwork and specify the central blower to account for the pressure drop across the filter. Air filter housings must be airtight to prevent bypass or leakage.
- Nonducted systems are **exempt** from the minimum MERV 8 requirements but must have an internal air filter in the air-handling unit.
- Install air filters rated MERV 6 or higher for mechanically supplied **outdoor air** for systems with 10 feet (3 meters) of ductwork or more, per ASHRAE 62.2–2010, Section 6.7.
- Projects may use equivalent filtration media class of F5 or higher for MERV 8 and G4 or higher for MERV 6, as defined by CEN standard EN779—2002.

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of this prerequisite.

EQ P6 Environmental Tobacco Smoke

Prerequisite applies to

- Homes
- Midrise



Intent

- To limit exposure of building occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke.

Requirements

- **Multifamily projects only**
- Prohibit smoking in **all common areas** of the building. The prohibition must be communicated in building rental or lease agreements or in condo or co-op association covenants and restrictions, and provisions for enforcement must be included.
- Locate any exterior designated smoking areas, including balconies where smoking is permitted, **at least 25 feet** (7.5 meters) from entries, outdoor air intakes, and operable windows opening to common areas.

Think About It....



Compliance with No Smoking Policy in common areas is based on posted signs.

- a) True
- b) False

EQ P7 Compartmentalization

Prerequisite Applies to

- Homes (Attached SF and LRMF) & Midrise



Intent

- To limit occupants' exposure to indoor air pollutants by minimizing the transfer of air between units.

Requirements

- Compartmentalize each residential unit to minimize leakage between units. Minimize uncontrolled pathways for environmental tobacco smoke and other indoor air pollutants between units by sealing penetrations in walls, ceilings, and floors and by sealing vertical chases (including utility chases, garbage chutes, mail drops, and elevator shafts) adjacent to the units.
- Weather-strip all doors in the residential units leading to common hallways to minimize air leakage into the hallway. Weather-strip all exterior doors and operable windows to minimize leakage from outdoors.
- Demonstrate acceptable sealing of residential units by a blower door test. Follow the procedure described by RESNET or the ENERGY STAR Multifamily High Rise Program Testing and Verification Protocols, Version 1.0, with an allowable maximum leakage of **0.23 cfm50 per square foot** (0.07 cmm50 per square meter) of enclosure (i.e., all surfaces enclosing the apartment, including exterior and party walls, floors, and ceiling).

Think About It....



Compartmentalization is calculated based on area of home's _____ ?

- a. Floor
- b. Walls and windows
- c. Ceiling
- d. All of the above

Indoor Environmental Quality (EQ)

EQ C1 Enhanced Ventilation

EQ C2 Contaminant Control

EQ C3 Balancing of Heating and Cooling Distribution Systems

EQ C4 Enhanced Compartmentalization

EQ C5 Combustion Venting

EQ C6 Enhanced Garage Pollutant Protection

EQ C7 Low-Emitting Products

EQ C8 No Environmental Tobacco Smoke

EQ C1 Enhanced Ventilation

Points

- Homes & [Midrise](#) (1–3 points)

Intent

- To minimize moisture problems and occupants' exposure to indoor pollutants through enhanced exhaust and ventilation systems.

Requirements

Option 1. Enhanced Local Exhaust (1 point)

AND/OR Option 2. Enhanced Whole-House Ventilation (2 points)

EQ C1 Enhanced Ventilation (cont'd)

Option 1. Enhanced Local Exhaust (1 point)

Use one of the following strategies in every bathroom with a shower, bathtub, or spa (i.e., half-baths are exempt) to control the use of the local exhaust fan:

- an occupancy sensor;
- an automatic humidistat controller;
- a continuously operating exhaust fan; or
- a delay timer that operates the fan for **at least 20 minutes**.

AND/OR Option 2. Enhanced Whole-House Ventilation (2 points)

Install a **balanced** whole-house ventilation system (not just exhaust only or supply only) that meets the minimum ventilation requirements of **ASHRAE Standard 62.2–2010**, Sections 4 and 7, or local equivalent whichever is more stringent. Program the system such that it does not exceed the standard's requirements by more than 10%.

For multifamily buildings, meet the above requirements for all in-unit residential spaces **in both options 1 and 2**.

Indoor Environmental Quality

Filter Credits

EQ Credit Enhanced Ventilation

Up to 3 points

Attempted Y M Verified

Option 1. Enhanced Local Exhaust (1 point)

Y M V

Bathroom exhaust fan control type in every bathroom with a shower, bathtub, or spa

AND/OR

Option 2. Enhanced Whole-House Ventilation (2 points)

Y M V

(Select one) ▼

A balanced whole-house ventilation system was designed and installed that meets ASHRAE 62.2-2010 sections 4 and 7.

(Select one)

The system does not exceed ASHRAE 62.2-2010 requirements by more than 10%.

Verification Measure

- Conduct on-site verification that each full bathroom has exhaust fan that either is controlled by occupancy sensor, humidistat, or delay timer that operates fan for at least 20 minutes, or runs continuously.

Think About It....



Changes in v4 EQ C1 Enhanced Ventilation include:

- a) Balanced supply
- b) 20 minute timer on exhaust
- c) Multifamily must enhance ventilation and exhaust
- d) All of the above
- e) None of the above

EQ C2 Contaminant Control

Points

- Homes (0.5–2 points)
- Midrise (0.5–2 points)

Intent

- To reduce occupants' exposure to indoor airborne contaminants through source control and removal.

Requirements

Case 1. Homes

- Option 1. Walk-off Mats (0.5 point)
- AND/OR Option 2. Shoe Removal and Storage (0.5 point)
- AND/OR Option 3. Preoccupancy Flush (0.5 points)
- AND/OR Option 4. Air Testing (1 point)**

Case 2. Mid-Rise

- Option 1. Walk-off Mats (0.5 point)
- AND/OR Option 2. Shoe Removal and Storage (0.5 point)
- AND/OR Option 3. Preoccupancy Flush (0.5 points)
- AND/OR Option 4. Air Testing (1 point)**



Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of Option 3.

EQ C2 Contaminant Control (cont'd)

Requirements

Case 1. Homes

Option 1. Walk-off Mats (0.5 point)

- At each *primary entryway* from the outdoors, design and install a permanent walk-off mat that is at least **4 feet long** (1.2 meters) and allows access for cleaning (e.g., grating with catch basin). Permanent walk-off mats are required only for primary exterior entryways, but nonpermanent walk-off mats are strongly recommended for other entryways.
- For regularly used common exterior entryways in multifamily buildings, install permanent systems that are at least **10 feet long** (3 meters) in the primary direction of travel to capture dirt and particulates.
- Acceptable entryway systems include permanently installed grates, grilles, and slotted surfaces that allow for cleaning underneath. Roll-out mats are acceptable only if maintained on a weekly basis by a contracted service organization.

EQ C2 Contaminant Control (cont'd)

Requirements

Case 1. Homes

AND/OR Option 2. Shoe Removal and Storage (0.5 point)

- Design a shoe removal and storage space near the primary entryway, separated from living areas. This space must be a permanent architectural feature and it must be large enough to accommodate a bench and at least two pairs of shoes per bedroom and must not have conventional carpet. Carpet tile is acceptable if it's specifically designed for entryway systems or similar use, including performance attributes equivalent to other acceptable entryway systems.
- **For multifamily buildings**, design a shoe removal and storage space at **each** residential unit's primary entrance.

EQ C2 Contaminant Control (cont'd)

Requirements

Case 1. Homes

AND/OR Option 3. Preoccupancy Flush (0.5 points)

- At installation, seal all permanent ducts and vents to minimize contamination from construction. Remove seals after all phases of construction are completed.
- After construction ends and before occupancy, flush the home with fresh air, according to the following guidelines:
- Remove any dust and debris from ducts.
- Flush the entire home for **48 hours**, keeping all windows and interior doors open; the 48 hours may be nonconsecutive if necessary.
- Keep all windows open and run a fan (e.g., HVAC system fan) continuously, or flush the home with all HVAC fans and exhaust fans operating continuously at the highest flow rate.

*For multifamily buildings, the requirements apply only to all **in-unit spaces**.*

EQ C2 Contaminant Control (cont'd)

Requirements

Case 1. Homes

AND/OR Option 4. Air Testing (1 point)

- After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline indoor air quality testing using protocols consistent with the methods listed in **Table 1**. Project teams must follow either the Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use.
- **Demonstrate** that contaminants do not exceed concentration levels listed in **Table 1**.

EQ C2 Contaminant Control (cont'd)

Table 1. Maximum concentration levels, by contaminant and testing method

<i>Contaminant</i>	<i>Maximum concentration</i>	<i>Maximum concentration (healthcare only)</i>	<i>ASTM and U.S. EPA methods</i>	<i>ISO method</i>
Formaldehyde	27 ppb	16.3 ppb	ASTM D5197; EPA TO-11 or EPA Compendium Method IP-6	ISO 16000-3
Particulates (PM10 for all buildings; PM2.5 for buildings in EPA nonattainment areas)	PM10: 50 micrograms per cubic meter PM2.5: 15 micrograms per cubic meter	20 micrograms per cubic meter	EPA Compendium Method IP-10	ISO 7708
Ozone (for buildings in EPA nonattainment areas)	0.075 ppm	0.075 ppm	ASTM D5149 - 02	ISO 13964
Total volatile organic compounds (TVOCs)	500 micrograms per cubic meter	200 micrograms per cubic meter	EPA TO-1, TO-15, TO-17, or EPA Compendium Method IP-1	ISO 16000-6
Target chemicals	CDPH Standard	CDPH Standard	ASTM D5197;	ISO 16000-3,

EQ C2 Contaminant Control (cont'd)

Table 1. Maximum concentration levels, by contaminant and testing method (cont'd)

<i>Contaminant</i>	<i>Maximum concentration</i>	<i>Maximum concentration (healthcare only)</i>	<i>ASTM and U.S. EPA methods</i>	<i>ISO method</i>
listed in CDPH Standard Method v1.1, Table 4-1, except formaldehyde	Method v1.1–2010, Allowable Concentrations, Table 4-1	Method v1.1–2010, Allowable Concentrations, Table 4-1	EPA TO-1, TO-15, TO-17, or EPA Compendium Method	16000-6
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	9 ppm; no more than 2 ppm above outdoor levels	EPA Compendium Method IP-3	ISO 4224

ppb = parts per billion; ppm = parts per million; µg/cm³ = micrograms per cubic meter

EQ C2 Contaminant Control (cont'd)

Option 4. Air Testing (cont'd)

- Conduct all measurements before occupancy but during normal occupied hours, with the building ventilation system started at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the test.
- The number of sampling locations depends on the size of the building and number of ventilation systems but must include the entire building and all representative situations. Include areas with the least ventilation and greatest presumed source strength.
- Collect air samples between 3 and 6 feet (900 and 1 800 millimeters) from the floor to represent the breathing zone of occupants over a minimum four-hour period.
- Measure particulate concentrations by a gravimetric method. Hand-held or real-time instruments are not acceptable unless they are calibrated on site against the standard gravimetric method.
- For each sampling point where the concentration exceeds the limit, take corrective action and retest for the noncompliant contaminants at the same sampling points. Repeat until all requirements are met.
- Refer to CA Section 01350, Appendix B, New Single-Family Residence Scenario, for air-testing guidance.

EQ C2 Contaminant Control (cont'd)

Requirements

Case 2. Midrise

Option 1. Walk-off Mats (0.5 point)

- At each unit's primary entryway from the outdoors, design and install a permanent walk-off mat that is at least **4 feet long** (1.2 meters) and allows access for cleaning (e.g., grating with catch basin).
- For regularly used common exterior entryways in multifamily buildings, install permanent systems that are at least **10 feet long** (3 meters) in the primary direction of travel to capture dirt and particulates. Acceptable entryway systems include permanently installed grates, grilles, and slotted surfaces that allow for cleaning underneath. Roll-out mats are acceptable only if maintained on a weekly basis by a contracted service organization.

EQ C2 Contaminant Control (cont'd)

Case 2. Midrise

AND/OR Option 2. Shoe Removal and Storage (0.5 point)

- In each unit, design a shoe removal and storage space near the entryway, separated from living areas. This space must be a permanent architectural feature, it may not have wall-to-wall carpeting, and it must be large enough to accommodate a bench and at least two pairs of shoes per bedroom.

EQ C2 Contaminant Control (cont'd)

Case 2. Midrise

AND/OR Option 3. Preoccupancy flush (0.5 point)

The Preoccupancy Flush can be awarded if the requirements are only met for **all in-unit spaces**.

At installation, seal all permanent ducts and vents to minimize contamination from construction. Remove seals after all phases of construction are completed.

After construction ends and before occupancy, flush the home with fresh air, according to the following guidelines:

- Remove any dust and debris from ducts.
- Flush the entire home, keeping all interior doors open for 48 hours; the hours may be nonconsecutive if necessary.
- Keep all windows open and run a fan (e.g., HVAC system fan) continuously, or flush the home with all HVAC fans and exhaust fans operating continuously at the highest flow rate.

*For multifamily buildings, the requirements apply only to **all in-unit spaces**.*

EQ C2 Contaminant Control (cont'd)

Case 2. Midrise

AND/OR Option 4. Air Testing (1 point)

- After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline indoor air quality testing using protocols consistent with the methods listed in **Table 1**. Project teams must follow either the current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use.
- Demonstrate that contaminants do not exceed concentration levels listed in **Table 1**.

Think About It....



Air testing is an alternative to preoccupancy flush.

- a) True
- b) False

EQ C3 Balancing of Heating and Cooling Distribution Systems

Points

- Homes and [Midrise](#) (1–3 points)

Intent

- To improve thermal comfort and energy performance by ensuring appropriate distribution of space heating and cooling in the home.

Requirements

Case 1. Forced-Air Systems

Option 1. Multiple Zones (1 point)

AND/OR Option 2. Supply Air-Flow Testing (1 point)

AND/OR Option 3. Pressure Balancing (1 point)

Case 2. Radiative Systems

Option 1. Multiple Zones (1 point)

AND/OR Option 2. Room-by-Room Controls (2 points)

EQ C3 Balancing of Heating and Cooling Distribution Systems (cont'd)

Requirements

Case 1. Forced-Air Systems

Option 1. Multiple Zones (1 point)

- Install a system with at least **two** space-conditioning **zones** with independent thermostatic controls. In houses with both a heating system and a cooling system, each must have at least two zones.
- Single-family houses with **less than 800 square feet** (74 square meters) of conditioned floor area and multifamily buildings whose average unit size is less than **1,200 square feet** (110 square meters) **automatically meet** the requirements of this credit.

EQ C3 Balancing of Heating and Cooling Distribution Systems (cont'd)

Requirements

Case 1. Forced-Air Systems

AND/OR Option 2. Supply Air-Flow Testing (1 point)

- Have the total supply air-flow rates in each room tested by a qualified energy rater using a flow hood with doors closed, or another acceptable method, per RESNET or ACCA Quality Installation Specifications.
- Supply air-flow rates must be within +/- 20% (or +/- 25 cfm or 11 lps) of calculated values from ACCA Manual J.
- Test multi-rate or multi-speed HVAC systems at the rate for which they were designed. Supply air-flow requirements must meet the higher of the cooling or heating designed air flow for each room.
- Ductless systems qualify for this credit.

EQ C3 Balancing of Heating and Cooling Distribution Systems (cont'd)

Requirements

Case 1. Forced-Air Systems

AND/OR Option 3. Pressure Balancing (1 point)

- For **each bedroom**, demonstrate a pressure difference of more than **3 Pa** (0.012 inch w.c.) with respect to the main body of the house when doors are closed and the air handler is operating on highest speed. The testing must be verified by a qualified energy rater.

EQ C3 Balancing of Heating and Cooling Distribution Systems (cont'd)

Requirements

Case 2. Radiative Systems

- Radiative systems include radiators, hot water baseboard systems, and other non-forced air heating and cooling systems.

Option 1. Multiple Zones (1 point)

- Install an HVAC system with at least **two zones** with independent thermostat controls. Each zone must have a separate loop and separate pump controlled automatically by a thermostat control. For HVAC systems with radiators, see Option 2.
- Houses with less than **800 square feet** (74 square meters) of conditioned floor area and multifamily buildings whose average unit size is less than **1,200 square feet** (110 square meters) **automatically meet** the requirements of this credit.

AND/OR Option 2. Room-by-Room Controls (2 points)

- Design the HVAC system with room-by-room thermostatic controls, such as **flow-control valves** on every radiator.

Think About It....



Single family homes less than 1200 square feet automatically qualify for this credit?

- A) True
- B) False

EQ C4 Enhanced Compartmentalization

Points

- Homes [*Attached SF and LRMF?*] (1 point) & [Midrise \(3 points\)](#)

Intent

- To minimize the exposure of building occupants to indoor air pollutants by preventing the transfer of air between units.

Requirements

- Perform a compartmentalization blower door test according to RESNET or the ENERGY STAR testing and verification protocols for multifamily midrise buildings, with an allowable maximum leakage of **0.15 cfm50 per square foot of enclosure** (0.04 cmm50 per square meter) - i.e., all surfaces enclosing the apartment, including exterior and party walls, floors, and ceiling.

Credit Example

EQ C4 Enhanced Compartmentalization

	Loose
Area (Sq Ft)	800
Enclosure (Sq Ft)	2560
Volume (Cu Ft)	6400
ACH50	7.0
CFM50	747
cfm/Sq Ft	0.29
Prereq	≤ 0.23
Credit	≤ 0.15
EQ C4 Pts - Homes	Fail
- Midrise	Fail

Indoor Environmental Quality

Filter Credits

EQ Prerequisite Compartmentalization

Required

Required

Verified

N

For multifamily and attached single-family projects

(Select one)

Each residential unit has sealed penetrations through walls, ceilings, and floors and vertical chases adjacent to units.

(Select one)

All doors in the residential units leading to common hallways have weather-stripping.

(Select one)

All exterior doors and operable windows have weather-stripping..

320.00

Blower door test results (cfm50)

2560.00

Envelope enclosure area (sq ft)

8.00

Leakage per area of enclosure (cfm50/sq ft)

0.125

Indoor Environmental Quality

Filter Credits

EQ Credit Enhanced Compartmentalization

Up to 3 points

Homes (1), Mid-rise (3)

Attempted Y

3

M

0

Verified

0

8.00

Leakage per area of enclosure (cfm50/sq ft)

Verification Measures

- Conduct on-site testing of compartmentalization using a blower door; OR Verify compartmentalization test results conducted by qualified energy rater or USGBC-approved alternative, according to HERS procedures.

EQ C5 Combustion Venting

Points

- Homes (1–2 points) & Midrise (1–2 points)

Intent

- To minimize the leakage of combustion gases into the occupied space of the home.

Requirements

Option 1. No Fireplace or Woodstove (2 points)

- Do not install any fireplaces or woodstoves.

Or Option 2. Enhanced Combustion Venting Measures (1 point)

- For any **wood- or pellet-burning** fireplaces and stoves, install equipment that is EPA qualified. Provide power or direct venting.
- For any **natural gas, propane**, or alcohol stoves, install equipment listed by an approved safety testing facility. The stove must have a permanently fixed glass front or gasketed door and an electronic pilot. Provide power or direct venting.

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of Option 2.

EQ C6 Enhanced Garage Pollutant Protection

Points

- Homes (1–2 points) & [Midrise \(1 point\)](#)

Intent

- To minimize occupants' exposure to indoor pollutants originating from an adjacent garage.

Requirements

Case 1. Single Family

Option 1. Exhaust Fan in Garage (1 point)

Or Option 2. No Garage, or Detached Garage, or Carport (2 points)

Case 2. Multifamily

Option 1. Exhaust Fan in Multicar Garage (1 point)

Or Option 2. Exhaust Fan in Small Garage (1 point)

Or Option 3. No Garage, or Detached Garage, or Carport (2 points)

Case 3. Midrise

Option 1. Exhaust Fan on Controls in Garage (1 point)

Option 2. Detached Garage or No Garage or Carport (1 point)

Projects that earn the EPA Indoor airPLUS label automatically meet the requirements of Option 1.

EQ C6 Enhanced Garage Pollutant Protection (cont'd)

Requirements

Case 1: Single Family Homes

Option 1. Exhaust Fan in Garage (1 point)

- Install in the garage an exhaust fan that is rated at least 75 cfm (35 liters per second) and meets ENERGY STAR cfm/w performance requirements.
- The fan must vent directly to the outdoors and have an automatic timer control linked to an occupant sensor, a light switch, a garage door opening-closing mechanism, a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm, or equivalent. The timer must be set to provide at least three air changes each time the fan is turned on.

OR Option 2. No Garage, or Detached Garage, or Carport (2 points)

Select one of the following strategies:

- Do not construct a garage.
- Install a detached garage, defined as a structure that does not share a wall with the home.
- Install a carport, defined as an open-air space with one complete wall, which may be shared with the home.

EQ C6 Enhanced Garage Pollutant Protection (cont'd)

Requirements

Case 2. Multifamily

Option 1. Exhaust Fan in Multicar Garage (1 point)

- For a garage that accommodates more than three cars, follow the requirements in ASHRAE 62.1–2010. Exhaust the garage sufficiently to create negative pressure with respect to adjacent spaces with the doors to the garage closed. Provide self-closing doors and deck-to-deck partitions or a hard lid ceiling. The pressure differential with the surrounding spaces must be at least 5 Pascals (Pa) (0.02 inches of water gauge) when all doors are closed. The exhaust fan may either run continuously, or on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.

OR Option 2. Exhaust Fan in Small Garage (1 point)

- For a garage that accommodates one, two, or three cars, install an exhaust fan that meets ENERGY STAR minimum efficacy levels (cfm/W)
- Direct-exhaust fans must be 100 cfm (47 liters per second) or greater, and ducted exhaust fans must be **130 cfm** (61 liters per second) or greater.

EQ C6 Enhanced Garage Pollutant Protection (cont'd)

Requirements

Case 2: Multifamily

OR Option 3. No Garage, or Detached Garage (2 points)

Select one of the following strategies:

- Do not construct a garage.
- Install a detached garage, defined as a structure that does not share a wall with the building.

EQ C6 Enhanced Garage Pollutant Protection (cont'd)

Requirements

Case 3. Midrise

Option 1. Exhaust Fan on Controls in Garage (1 point)

- For a garage that accommodates more than three cars, follow the requirements in ASHRAE 62.1–2010. Exhaust the garage sufficiently to create negative pressure with respect to adjacent spaces with the doors to the garage closed. Provide self-closing doors and deck-to-deck partitions or a hard lid ceiling. The pressure differential with the surrounding spaces must be at least 5 Pascals (Pa) (0.02 inches of water gauge) when all doors are closed. The exhaust fan may either run continuously, or on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.

OR Option 2. Detached Garage or No Garage or Carport (1 point)

- If a garage is constructed, it may not share a wall with the building.

EQ C7 Low-Emitting Products

Points

- Homes (0.5-3 points) & [Midrise \(0.5-3 points\)](#)

Intent

- To reduce occupants' exposure to airborne chemical contaminants through product selection.

Requirements

- In the interior of the home, use products that have been tested and found compliant with the California Department of Public Health Standard Method V1.1–2010, using CA Section 01350, Appendix B, New Single-Family Residence Scenario, for emissions testing guidance.
- At least 90% of a component must meet the requirements to earn credit.

EQ C7 Low-Emitting Products (cont'd)

- For site-applied interior **paints** and coatings, meet the requirements of CA Section 01350 (0.5 point).
- For **flooring**, meet the requirements of CA Section 01350 (0.5 point).
- For **insulation**, meet the requirements of CA Section 01350 (0.5 point).
- For site-applied **adhesives and sealants**, meet the requirements of CA Section 01350 (0.5 point).
- For **composite wood products** be constructed from materials documented to have low formaldehyde emissions that meet the California Air Resources Board requirements for ultra-low-emitting formaldehyde (ULEF) resins or no-added formaldehyde based resins. Salvaged and reused architectural millwork more than one year old at the time of occupancy is considered compliant provided any site-applied paints, coatings, adhesives, and sealants meet the requirements. Wood structural panels conforming to DOC PS-1 or PS-2 and manufactured with moisture-resistant adhesive for "Exposure 1" or "Exterior" application as indicated on the panel by the trademark of an approved testing and grading agency are **exempt**. (1 point) .

Indoor Environmental Quality

Filter Credits

EQ Credit Low-Emitting Products

Up to 3 points

Attempted

Y

1

M

0

Verified

0

Select all that apply. At least 90% of a component must meet the requirement:

True

Site-applied interior paints and coatings have been tested and meet the requirements of CA Section 01350. (0.5 point)

(Select one)

Flooring has been tested and meets the requirements of CA Section 01350. (0.5 point)

(Select one)

Insulation has been tested and meets the requirements of CA Section 01350. (0.5 point)

True

Site-applied adhesives and sealants have been tested and meet the requirements of CA Section 01350. (0.5 point)

(Select one)

Composite wood products have been tested and meet the California Air Resources Board requirements for ultra-low-emitting formaldehyde (ULEF) resins or no-added formaldehyde based resins. (1 point)

Verification Measures

- Verify that installed components satisfy requirements, using product literature or labels.
- Verify that installed components satisfy requirements, using product literature or labels.

Think About It....



Exemplary performance is available for Low Emitting Products.

- a) True
- b) False

EQ C8 No Environmental Tobacco Smoke

Points

- Midrise (1 point)

Intent

- To minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke.

Requirements

- Prohibit smoking throughout the building, including within living units. The prohibition must be communicated in building rental or lease agreements or in condo or co-op association covenants and restrictions, and provisions for enforcement must be included.

Indoor Environmental Quality

Filter Credits

EQ Credit No Environmental Tobacco Smoke

1 point

Attempted Y

1

M

0

Verified

0

True

Smoking is prohibited throughout the building, including within living units.

True

The prohibition is communicated to tenants through building rental or lease agreements or in condo or co-op association covenants. Restrictions and provisions for enforcement are also included.

Verification Measures

- Conduct on-site verification of signage indicating smoking and nonsmoking areas.
- Conduct on-site verification that any smoking areas are at least 25 feet (7.5 meters) away from entries, outdoor air intakes, and operable windows.

Think About It....



How is Indoor airPlus treated in v4 EQ?

- a) Same as v 2008 (w/ 13 pts)
- b) Same as v2008 (w/ fewer points)
- c) Not included in v4 (no points)
- d) Moved to another credit category

Comparison of LEED for Homes Versions

Credit #		Credit Name	Single Family (Max. Points)		Midrise (Max. Points)	
V 2008	V 4.0		V 2008	V 4.0	V 2008	V 4.0
EQ 1	N/A		13			
EQ 2.1	EQ P2	Combustion Venting	Prereq	Prereq		
EQ 2.2	EQ C5	Combustion Venting	2	2		
EQ 3	N/A	Moisture Control	1	N/A	Removed	
EQ 4.1	EQ P1 (2)	Ventilation	Prereq	Prereq		
EQ 4.2	EQ C1 (2)	Enhanced Ventilation *	2	2		
EQ 4.3	EA P1	3 rd Party Verification	1	N/A	Removed	
EQ 5.1	EQ P1 (1)		Prereq	Prereq		
EQ 5.2	EQ C1 (1)	Enhanced Ventilation *	1	1		
EQ 5.3	EA P1	3 rd Party Verification	1	N/A		
EQ 6.1	EA P1	Room by Room Load Calc	Prereq	Prereq		
EQ 6.2	EQ C3 (3)	Balancing HVAC Systems	1	3		
EQ 6.3		3 rd Party Verification	2			

Comparison of LEED for Homes Versions

Credit #		Credit Name	Single Family (Max. Points)		Midrise (Max. Points)	
V 2008	V 4.0		V 2008	V 4.0	V 2008	V 4.0
EQ 7.1	EQ P5	Air Filtering	Prereq	Prereq		
EQ 7.2		Better Filters	1	N/A		
EQ 7.3		Best Filters	2	N/A		
EQ 8.1	N/A	Protect Ducts	1	N/A		???
EQ 8.2	EQ C2	Contaminant Control	2	2		
EQ 8.3		Preoccupancy Flush	1			
EQ 9.1	EQ P4	Radon Resistant Construction	Prereq	Prereq		
EQ 9.2	N/A	Moderate Risk Areas	1	N/A		
EQ 10.1	EQ P3	Garage Pollutant Protection	Prereq	Prereq		
EQ 10.2	N/A	Minimize Pollutants	2	N/A		
EQ 10.3	EQ C6 (1)	Exhaust Fan	1	1		
EQ 10.4	EQ C6 (2)	OR No / Detached Garage	3	2		

Removed

Comparison of LEED for Homes Versions

Credit #		Credit Name	Single Family (Max. Points)		Midrise (Max. Points)	
V 2008	V 4.0		V 2008	V 4.0	V 2008	V 4.0
EQ 11.1	EQ P6	Limit Exposure to ETS	N/A	Prereq *	1	Prereq
EQ 12.1	EQ P7	Compartmentalization	N/A	Prereq *	Prereq	Prereq
EQ 12.2	EQ C4	Enhanced Compartment'n	1	1		
MR 2.2	EQ C7	Low Emitting Products	3	3		
Total			21	16	Same	Same

Notes: * Applies to attached single family homes and multifamily buildings only
 Minimum point floor is 3 points. **(6 in v2008)**

Project Examples

- Apply EQ prereqs and credits to a project
 - Single family home
 - Low-rise multi-family building
 - Mid-rise multi-family building

Project Example

Indoor Environmental Quality (EQ) Prereqs

EQ P1 Ventilation

EQ P2 Combustion Venting

EQ P3 Garage Pollutant Protection

EQ P4 Radon-Resistant Construction

EQ P5 Air Filtering

EQ P6 Environmental Tobacco Smoke

EQ P7 Compartmentalization

Project Example

Indoor Environmental Quality (EQ) Prereqs

Credit	Description	Single Family Detached
C1	Enhanced Ventilation	1 / 3
C2	Contaminant Control	1 / 2
C3	Balancing of HVAC	2 / 3
C4	Compartmentalization	0 / 1
C5	Combustion Venting	1 / 2
C6	Garage Pollutants	0 / 2
C7	Low Emitting Products	1 / 3
C8	No ETS	N/A
Total		6 / 16

Minimum Point Floor = 3 Points

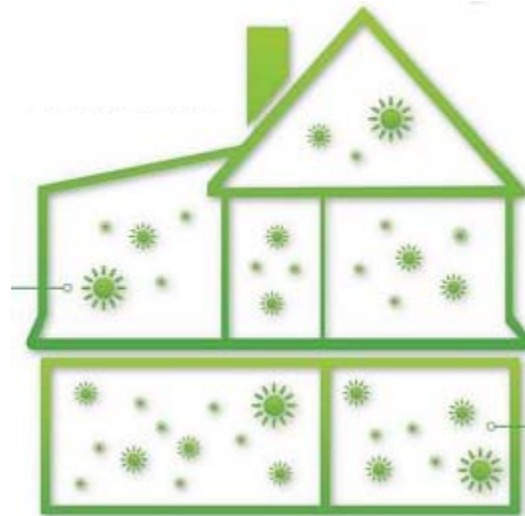
Think About it

Total EQ Points Available: 16 (18 Mid-Rise)

<u>Level</u>	<u>% of Max.</u>	<u>Goal</u>	<u>Achieved</u>
Certified	40%	6.5 pts.	6 Pts - Single Family
Silver	50%	8 pts	8 Pts - Low Rise
Gold	60%	9.5 pts.	
Platinum	80%	13 pts	

Summary: Module 7

Environmental Quality (EQ)



**Indoor
Pollutants
>>
Outdoor
Pollutants
??**

Learning Objectives

Materials and Resources (MR)



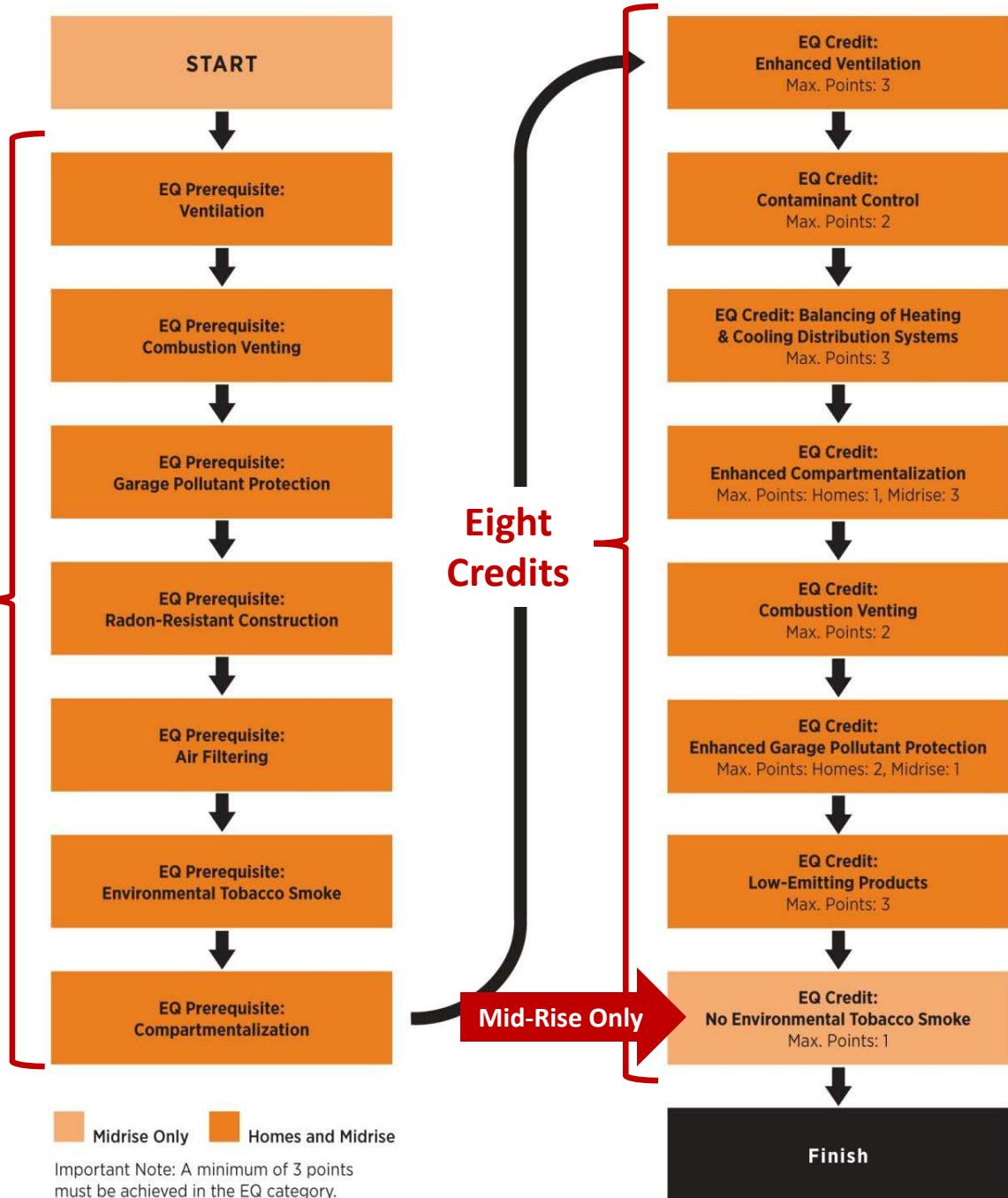
Student participants will be able to:

- Describe changes in v4 Rating System from v2008.
- Identify prereqs and credits in the EQ category.
- Apply MR prereqs and credits to a project.
- Fill-out the v4 workbook.

Indoor Environmental Quality (EQ)



Seven Prereqs



Midrise Only Homes and Midrise

Important Note: A minimum of 3 points must be achieved in the EQ category.

Overview of EQ

New Prereqs

EQ P1 Ventilation (Std 62.2-2010)

EQ P6 No ETS in Common Areas*

EQ P7 Compartmentalization*

* For ALL Attached SF, & Lowrise and Midrise MF

Point Floor

Changed from 6 pts. to 3 pts.

Moved In

MR 2.2 Low Emitting Products

Total Points

From 22 to 16



Overall Impact: Beneficial for ...

Next Module

What's Next?



Module 8: IN / RP /AE / Tools /Process

Module 9: Scoring of Example Projects



Questions
THANK YOU!



WhisperGreenSelect™

VENTILATION FAN

Panasonic

One Fan-
Endless IAQ Solutions



WhisperGreen Select Pick-A-Flow Technology 50-80-110 CFM + Plug 'N Play modules = The ability to create your perfect fan

Introducing Panasonic WhisperGreen Select™.
The customizable vent fan for virtually any application.

Thanks to an impressive array of advanced options, our new WhisperGreen Select is the ideal all-purpose IAQ Solution. The ingenious new Pick-A-Flow (50-80-110 CFM) technology gives you the ability to select your required air flow with just the flip of a switch. Then, a set of four unique Plug 'N Play modules allow you to further customize the fan by choosing Multi-Speed Operation, Motion Sensor, Condensation Sensor and Automatic LED Night Light. With Multi-Speed you can select the proper CFM settings to satisfy ASHRAE 62.2 continuous ventilation requirements. WhisperGreen Select also features our revolutionary DC Motor with SmartFlow™ optimum CFM technology and our unique LED replaceable lamps. Our new Flip-2-Fast™ bracket system provides quick and easy installation. WhisperGreen Select can also be used to comply with LEED for Homes, CalGreen and ENERGY STAR® for Homes 3.0.

Learn more about the fan that does it all at us.panasonic.com/ventfans.



Multi-Speed



Condensation Sensor



Motion Sensor



Motion Sensor






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